THE UNIVERSITY OF BRITISH COLUMBIA

Math 414 Section 101

Homework 7 *Due by 1pm on November 3, 2017*

1. A square is divided into 36 squares, of which at least 35 are 1x1. What can one say about the 36th square? Find all solutions.(Suyin's problem)

2. A player is playing against a dealer in blackjack. The dealer is showing a ten and a nine, but the player has not looked at his cards. What is the probability that the player beats the dealer? (Brandon's problem)

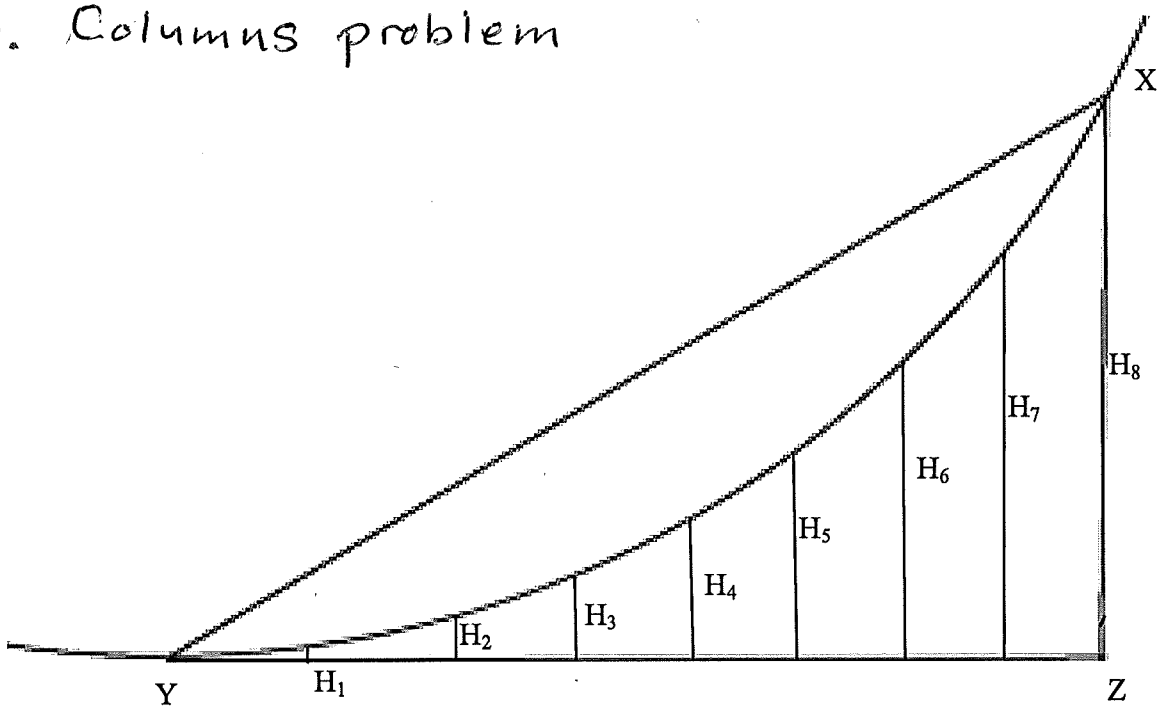
3. Columns problem (see below)

4. Reindeer problem (see below)

5. Create a problem that every grade 12 student should be able to do but that most grade 6 or grade 7 students would not have the background for.

Note: Please make a photocopy or handwritten copy of the problem you create in question 5 and hand that in as the same time as the homework.

3. Columns problem



An arc of a circle passes through points X and Y. Let YZ be tangent to the circle at Y and XZ perpendicular to YZ. Divide YZ into 8 equal segments and find the heights H_i, $i = 1,\ldots,8$, to the circular arc at each segment endpoint in terms of the lengths of XZ and YZ.

4. Reindeer problem

Santa's Reindeer

Santa's reindeer are a noisy bunch. But each of the sixteen of them makes a different combination of noises so Santa can tell them apart in the dark.

There are sixteen reindeer corresponding to the numbers 1 to 16. Below you can see the name of each reindeer and the noises it makes. For example, Rudolph goes "whinney, humph, snort, jangle, sniffle".

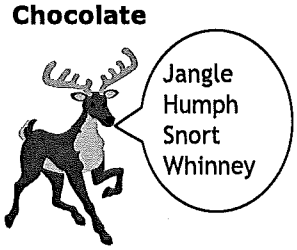
Each noise corresponds to a different mathematical property. These are:

prime number	multiple of 10
square number	factor of 24
multiple of 3	less than 10
multiple of 5	less than 12

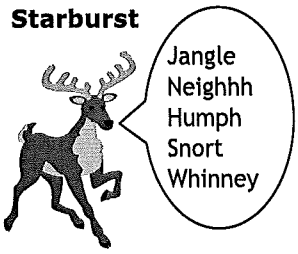
As well as these, each reindeer jingles or jangles, but not both.

Which reindeer goes with which number?

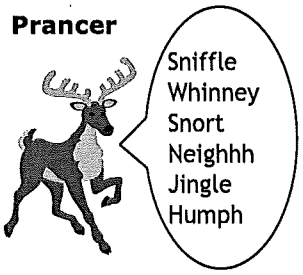
Chocolate



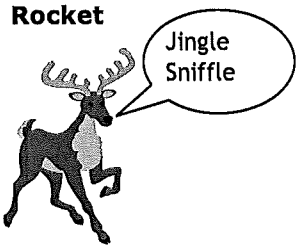
Starburst



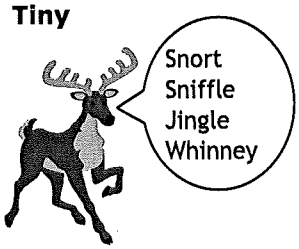
Prancer



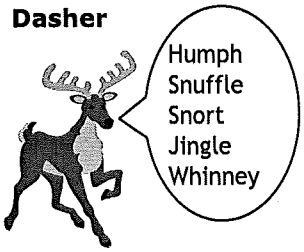
Rocket



Tiny

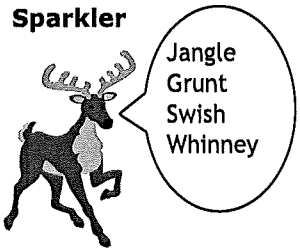


Dasher

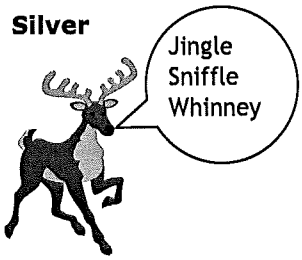


Wild Thing

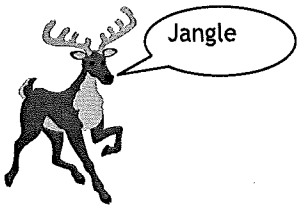
Sparkler



Silver

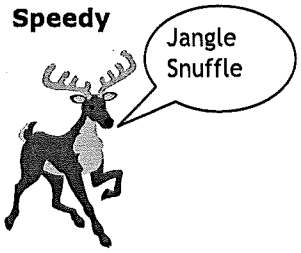


Nightfire

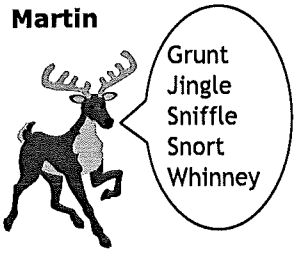


Snowflake

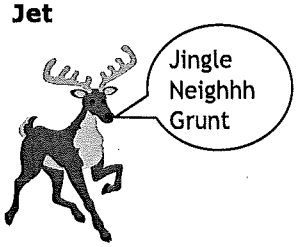
Speedy



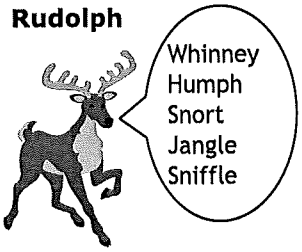
Martin



Jet



Rudolph



Happy